



PS200 Hydrophobic Coating



By John H. MacMillan Ph.D.

PS200 is an alkylsilane solution which dissolves in water to form an active silanol prepolymer, which can be bonded to glass or other hydroxyl active surfaces. **PS200** provides surfaces that have the following properties:

- Increased surface resistivity
- Enhanced lubricity
- Improved water repellency
- Non-adherent, non-oily surfaces
- Greater scratch resistance
- Easier cleaning, improved appearance

Standard long chain alkylsilanes are water insoluble and form unstable emulsions. **PS200** forms a clear homogeneous water solution of C18 silane ideally suited for coating glass parts in factory environments.



USES

Applications where **PS200** have been used successfully include:

Fluorescent light bulbs - increases scratch resistance, reducing breakage: increases surface resistivity.

Laboratory glassware - improves drainage, reduces breakage. Porcelain ware provides a glide surface and reduces adhesion to other porcelain ware.

Optical fibers - provides lubricity and reduces breakage during fabrication and in operational flexing.

Clinical analysis - treatment of analytical equipment extends clotting time of blood. Reduces hemolysis, reduces protein adsorption. **PS200** is not for food or drug use.

PROPERTIES OF TREATED SURFACES

Values reported are for glass slides dipped in 1% solutions of **PS200** and cured at 100°C.

Critical surface tension

Untreated	$\gamma_c = 78$ dynes/cm
Treated (hydrophobic)	$\gamma_c = 31$ dynes/cm

Surface resistivity

Untreated	1×10^{12} ohms
Treated	1.2×10^{13} ohms

Coefficient of friction static

(glass slide on glass slide)

Untreated	0.9 -1.0
Treated	0.2 - 0.3

Blood protein adsorption

Comparative 100 hour adsorption value for whole human blood on borosilicate glass surfaces

untreated	0.13mg/mm ²
treated	0.01 - 0.02mg/mm ²

These results are not meant to suggest "in vivo" application of **PS200**. **PS200** should be used only in treatment or diagnostic apparatus for clinical analysis in outside the human body applications.

DESCRIPTION

PS200 a monomeric octadecylsilane derivative in a solution of t-butanol and diacetone alcohol that reacts with water to form a silanol-rich prepolymer and an alcohol. The silanol-rich prepolymer is able to condense with available hydroxy groups of glass, other hydroxyl rich fillers, active metals or plasma treated plastics to form a chemically bound alkylsilicone. **SEE FIGURE 1**

TYPICAL PROPERTIES OF PS200

% active silane	20%
Color. Gardner scale	11 max
Flashpoint	10°C
Specific gravity (25°C)	0.88
Solidification point	-30°C

APPLICATION METHODS

PS200 is most frequently used as a dilute aqueous solution containing 0.1%-1.0% of reactive silicone prepolymer. A 0.2% solution of active chemical can be easily prepared by adding one part by weight of the **PS200** as supplied to 99 parts of water while stirring. The following procedure is frequently employed.

1. Thoroughly clean objects with an alkaline detergent. Used-glass surfaces may require immersion in 2-3% sodium hydroxide. All detergent or alkali should be removed with a final rinse.
2. Prepare a 1% solution of **PS200** in distilled/deionized water. Tap water, but not "hard water" is acceptable in many areas.
3. Immerse the glass or vitreous surface in the solution for a minimum of 5-10 seconds, ensuring that all surfaces are wetted by the solution. Agitation of the solution or the part generally results in more uniform deposition. After immersion remove the part and thoroughly rinse with water to remove excess **PS200** from the surface.
4. Cure **PS200** coatings by bringing surface temperature to 100°C for 3-5 minutes. Room temperature cure may be accomplished by air-drying for 24 hours if relative humidity is 65% or less.

Each liter of 1% **PS200** solution in water will coat approximately 80 one liter beakers or 600 15cm test tubes. It will coat approximately 250 m² of surface.

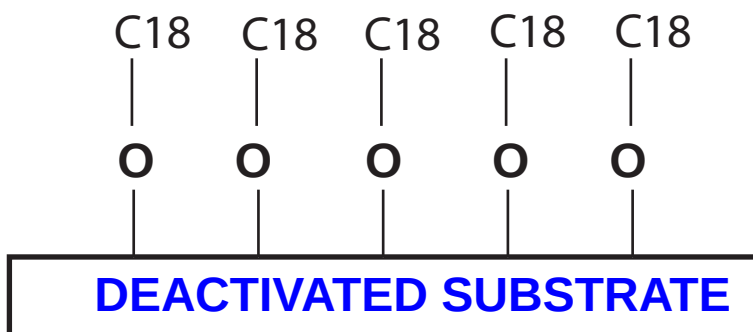
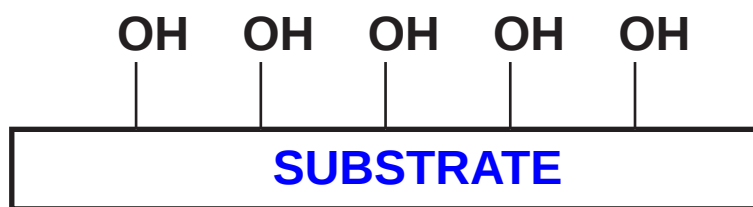
FIGURE 1



PS200

SILANOL PREPOLYMER

+



STABILITY OF PS200 AND SOLUTIONS

Aqueous solutions of **PS200** are not stable indefinitely and may turn cloudy and precipitate after standing for several days. The solution stability can be optimized by adjusting the pH of the solution to 4.5-5.

Concentrated **PS200** readily adsorbs moisture resulting in formation of a white precipitate. The container should be tightly sealed when not in use. A small amount of precipitate may form during storage, but this will not affect coating properties. Precipitate should be allowed to settle and the clear supernatant used. If over one-third the volume of the solution contains precipitate it should not be used. The solution may also turn cloudy at low temperatures due to freezing of the t-butanol. Gentle warming will return it to its original condition. Shelf life is 6 months from the date of manufacture.

Once cured, **PS200** films are durable enough to withstand autoclaving. Films on soda lime glass have less stability than those on borosilicate or quartz surfaces. In normal use the molecular film is usually removed by wear.

REMOVAL OF PS200 FILMS

The most efficient method for removal of **PS200** films is immersion in ethanolic potassium hydroxide. The silicone can also be removed by strong alkaline solution (5% sodium hydroxide), butyl alcohol or hydrofluoric acid solutions.

CAUTIONS IN HANDLING

PS200 CAN CAUSE SEVERE BURNS TO EYES AND IRRITATION OF THE SKIN. IN CASE OF CONTACT WITH EYES, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES AND GET PROMPT MEDICAL ATTENTION. IN CASE OF SKIN CONTACT, FLUSH WITH PLENTY OF WATER. THE MATERIAL SHOULD BE HANDLED IN AREAS WITH ADEQUATE VENTILATION TO PREVENT EXCESSIVE EXPOSURE TO SOLVENT VAPORS.

PS200 IS NOT FOR FOOD OR DRUG USE.

PS200 IS SUPPLIED IN A FLAMMABLE SOLVENT SYSTEM. FIRES MAY BE EXTINGUISHED WITH CO₂ OR FOAM.

OTHER SILICONE COATINGS

- PS216** A CHLOROSILOXANE RESIN USED FOR RELEASE AND HYDROPHOBIC COATINGS.
- PS221** A PRESSURE SENSITIVE ADHESIVE.
- PS252** A MOISTURE CURABLE SILICONE.
- PS233** A ONE PART THERMAL CURE SILICONE.
- PS235** A SILICON DIOXIDE PRECURSOR, THERMAL CURE.



UNITED CHEMICAL TECHNOLOGIES, INC.

2731 Bartram Road, Bristol, PA 19007

Phone: 800-541-0559

215-781-9255

Fax: 215-785-1226

www.unitedchem.com

E-Mail: info@unitedchem.com